

**A Wasp Parasite of the Possum Tick, *Ixodes tasmani*,
in Australia¹**

(Hymenoptera : Encyrtidae; Acarina : Ixodidae)

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The encyrtids, an economically important family, parasitize many agricultural pests (especially the Coccidae) and ticks which are vectors of human and other animal diseases. Several genera of these wasps exhibit polyembryony and are interesting from a purely biological standpoint.

Peck (1963) lists only two species of Chalcidoidea known to parasitize ticks in the Nearctic Faunal Region. These species, *Hunterellus hookeri* Howard and *Ixodiphagus texanus* Howard, have a wide geographic distribution (*H. hookeri* is cosmopolitan) and attack many species of ixodid ticks (see Host-Parasite list below). At least three other species are known to use ticks as hosts in other parts of the world. *Ixodiphagus hirtus* Nikolskaya was recovered and described from *Ixodes persulcatus* Schulze in Russia (Nikolskaya, 1950), and *Ixodiphagus mysorensis* Mani was collected and described from *Ornithodoros* sp. from Mysore, India (Mani, 1941). Fiedler (1953) described *Hunterellus theilerae* Fiedler as a parasite of nymphs of *Hyalomma truncatum* Koch in Marienthal District, Southwest Africa, and of *Rhipicephalus oculatus* Neumann in Transvaal, South Africa. Kaiser and Hoogstraal (1958) and Hoogstraal and Kaiser (1961) have reported *H. theilerae* from *Hyalomma marginatum rufipes* on birds migrating from East Africa through Egypt.

Immature *Ixodes tasmani* Neumann were collected from ring-tail possums, *Pseudocheirus peregrinus laniginosus* (Gould), and reared to the adult stages. Although no attempt was made to search for tick parasites, *Ixodiphagus mysorensis* were recovered from two tick collections. The wasps were kindly identified by R. F. Riek of C.S.I.R.O., Canberra, Australia. One collection was made 30 September 1962, at Warramate Hills, Victoria, Australia. Sixteen days later (16 October 1962) eight adult male parasites emerged from an engorged nymphal *Ixodes tasmani* Neumann. The wasps made a circular hole posteroventrally in the integument of the tick and escaped. The interior of the tick had been completely destroyed and the tick body was filled with exuviae

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and small brown spheres of wasp frass. The adult male wasps lived only 3 or 4 days at room conditions (approximately 20° C and an unknown, but high, relative humidity).

On 23 April 1963, I collected a partly engorged, nymphal *Ixodes tasmani* from a *Pseudocheirus peregrinus laniginosus*. On dissection of the living nymph I found ten larval hymenopterous parasites. Seven of these were similar in length and size and the other three appeared to be in the initial stages of forming pupae. The parasites were placed in insect saline (Shen's solution) and after 24 hours a transparent, membranous envelope surrounded each parasite. For information relative to the biology and ecology of *Ixodiphagus* and *Hunterellus* consult Wood (1911), Cooley and Kohls (1933), Larson and Green (1938), Clausen (1940), Smith and Cole (1943), Pervomaisky (1947), and Hoogstraal and Kaiser (1961).

The tick host of the second collection was captured 4 miles east of Warburton in the Yarra River Valley, Victoria, Australia, about 20 miles from the area where the infested tick had been found during the preceding spring (October 1962). The immature wasps were not identified, but probably were *Ixodiphagus mysorensis* since they were found in the same host species, in the same type of general habitat, and both occurred 20 miles apart in the Yarra River Valley. In addition to this finding of *I. mysorensis* in Victoria, Australia, in September 1962 and April 1963, R. F. Riek (unpublished) recovered it from nymphs of the wallaby tick, *Haemaphysalis bancrofti* Nuttall and Warburton, in February 1963. Thus, it is evident that this parasite is widely distributed.

The feasibility of using encyrtids as a biological control of ticks is questionable. *Hunterellus hookeri* has been used several times in attempts to control several species of ticks. Cooley and Kohls (1933) reported that the Rocky Mountain spotted-fever tick, *Dermacentor andersoni* (Stiles), was not effectively controlled after releasing millions of parasites in tick-infested areas. In spite of the poor results of the parasite release in the Rocky Mountain region, Smith and Cole (1943) thought it possible that *H. hookeri* might provide a control of *Dermacentor variabilis* (Say) if a colony could be established and maintained by repeated releases. They made such an attempt in 1937, 1938, and 1939 by releasing 90,000 females in two localities on the island of Martha's Vineyard, Massachusetts. No reduction in tick abundance attributable to the wasps was found and, in fact, no wasps were recovered in ticks collected in the area from 1937 to 1942. According to Ushakova (1962), *H. hookeri* were imported from the United States and released in the Leningrad area of Russia in 1935 to control *Ixodes*

ricinus (Linnaeus), but after an encouraging start no positive results were produced. He believed that these failures do not exclude use of local populations of encyrtids against ixodid ticks and that biological control measures are possible with such species as *Haemaphysalis concinna* Koch, *Ixodes persulcatus* Schulze, *Rhipicephalus pumilo* Schulze, *Hyalomma dromedarii* Koch, and others. Unfortunately, Ushakova's (1962) supporting evidence is unconvincing.

HOST-PARASITE LIST

Parasite	Host
<i>Ixodiphagus texanus</i> Howard	<i>Dermacentor variabilis</i> (Say)
	<i>Haemaphysalis leporis-palustris</i> (Packard)
	<i>Ixodes cookei</i> Packard
	<i>I. dentatus</i> Marx
	<i>I. scapularis</i> Say
	<i>Rhipicephalus sanguineus</i> (Latreille)
	<i>Ixodes persulcatus</i> Schulze
	<i>Ixodes tasmani</i> Neumann
	<i>Haemaphysalis bancrofti</i> Nuttall and Warburton
	<i>Ornithodoros</i> sp.
<i>Ixodiphagus hirtus</i> Nikolskaya	<i>Dermacentor andersoni</i> Stiles
	<i>D. parumapertus</i> Neumann
	<i>D. variabilis</i> (Say)
	<i>Haemaphysalis leporis-palustris</i> (Packard)
	<i>H. concinna</i> Koch
	<i>Ixodes dentatus</i> Marx
	<i>I. persulcatus</i> Schulze
	<i>I. muris</i> Bishopp and Smith
	<i>I. crenulatus</i> Koch
	<i>I. scapularis</i> Say
	<i>I. marmotae</i> Cooley and Kohls
	<i>Rhipicephalus sanguineus</i> (Latreille)
	<i>R. pumillo</i> Schulze
<i>Hyalomma dromedarii</i> Koch	
<i>H. japonica douglasi</i> Nuttall	
<i>Hyalomma truncatum</i> Koch	
<i>H. marginatum rufipes</i> Koch	
<i>Rhipicephalus oculatus</i> Neumann	
<i>Ixodiphagus mysorensis</i> Mani	
<i>Hunterellus hookeri</i> Howard	
<i>Hunterellus theilerae</i> Fiedler	

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MEETING ANNOUNCEMENT

The annual meeting of the Entomological Society of America will be held 30 November to 3 December at the Benjamin Franklin Hotel, Philadelphia, Pennsylvania.